US 20090090431A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2009/0090431 A1**

(43) **Pub. Date: Apr. 9, 2009**

Yacko et al.

(54) **SYSTEM AND APPARATUS FOR DISPENSING CONCENTRATED MATERIALS**

(75) Inventors: **R. Bruce Yacko**, Toledo, OH (US); **Edward L. Mueller**, Toledo, OH (US); **Jeffrey C. Gayer**, Sylvania, OH (US); **Douglas F. Taylor**, Toledo, OH (US); **Luke Stonis**, Columbus, OH (US); **Gary E. Myers**, New Albany, OH (US); **Tim C. Rothwell**, Dublin, OH (US); **Robert J. Hayes**, Lewis Center, OH (US)

Correspondence Address:
MACMILLAN SOBANSKI & TODD, LLC
ONE MARITIME PLAZA FIFTH FLOOR, 720 WATER STREET
TOLEDO, OH 43604-1619 (US)

(73) Assignee: **IDISPENSE LLC**, Toledo, OH (US)

(21) Appl. No.: **12/210,746**

(22) Filed: **Sep. 15, 2008**

Related U.S. Application Data

(60) Provisional application No. 60/993,578, filed on Sep. 13, 2007, provisional application No. 61/061,677, filed on Jun. 16, 2008.

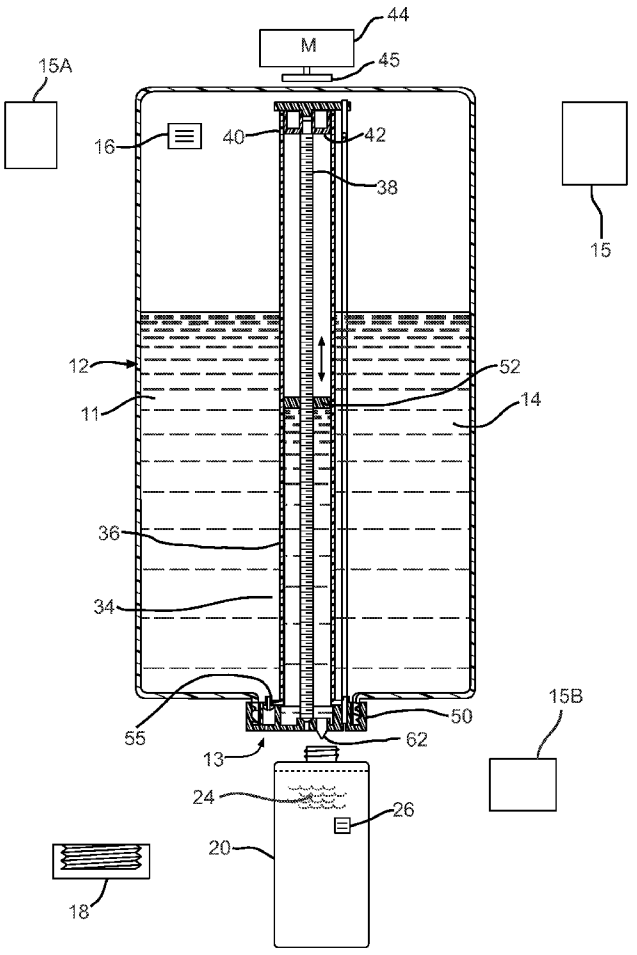
Publication Classification

(51) **Int. Cl.**
B67D 5/08 (2006.01)
B65B 1/04 (2006.01)

(52) **U.S. Cl.** **141/26**; 141/192; 141/94; 141/95; 141/322

(57) **ABSTRACT**

A dispensing source container suitable for containing and dispensing fluid concentrate has an opening suitable for receiving a closure. The source container includes a fluid-tight vessel configured to hold fluid concentrate, and a pump connectable to the opening of the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of fluid concentrate in the temporary reservoir. The pump is also operable to dispense a metered amount of the fluid concentrate from the temporary reservoir to dispense the fluid concentrate from the source container into receiving containers.



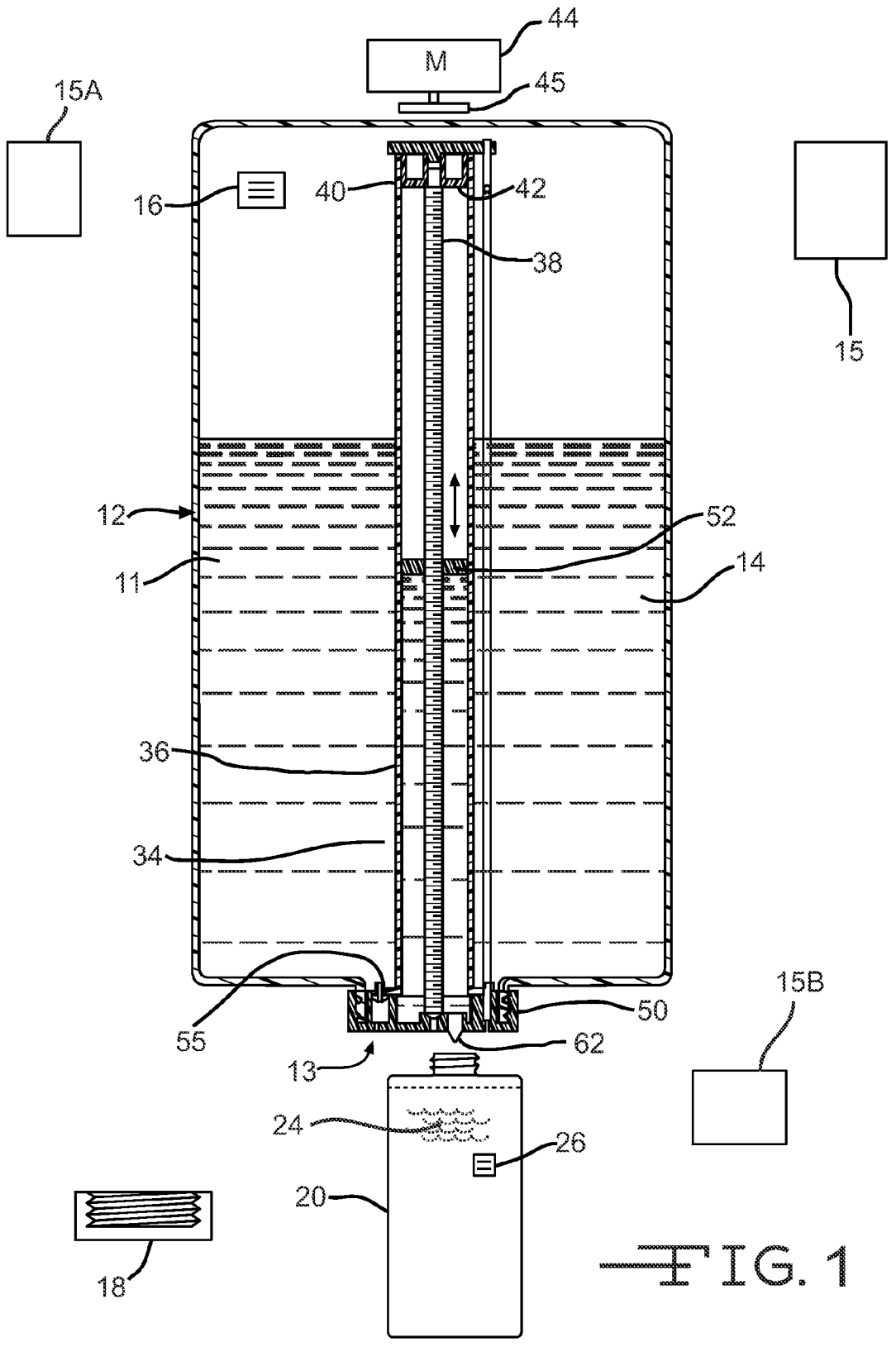


FIG. 1

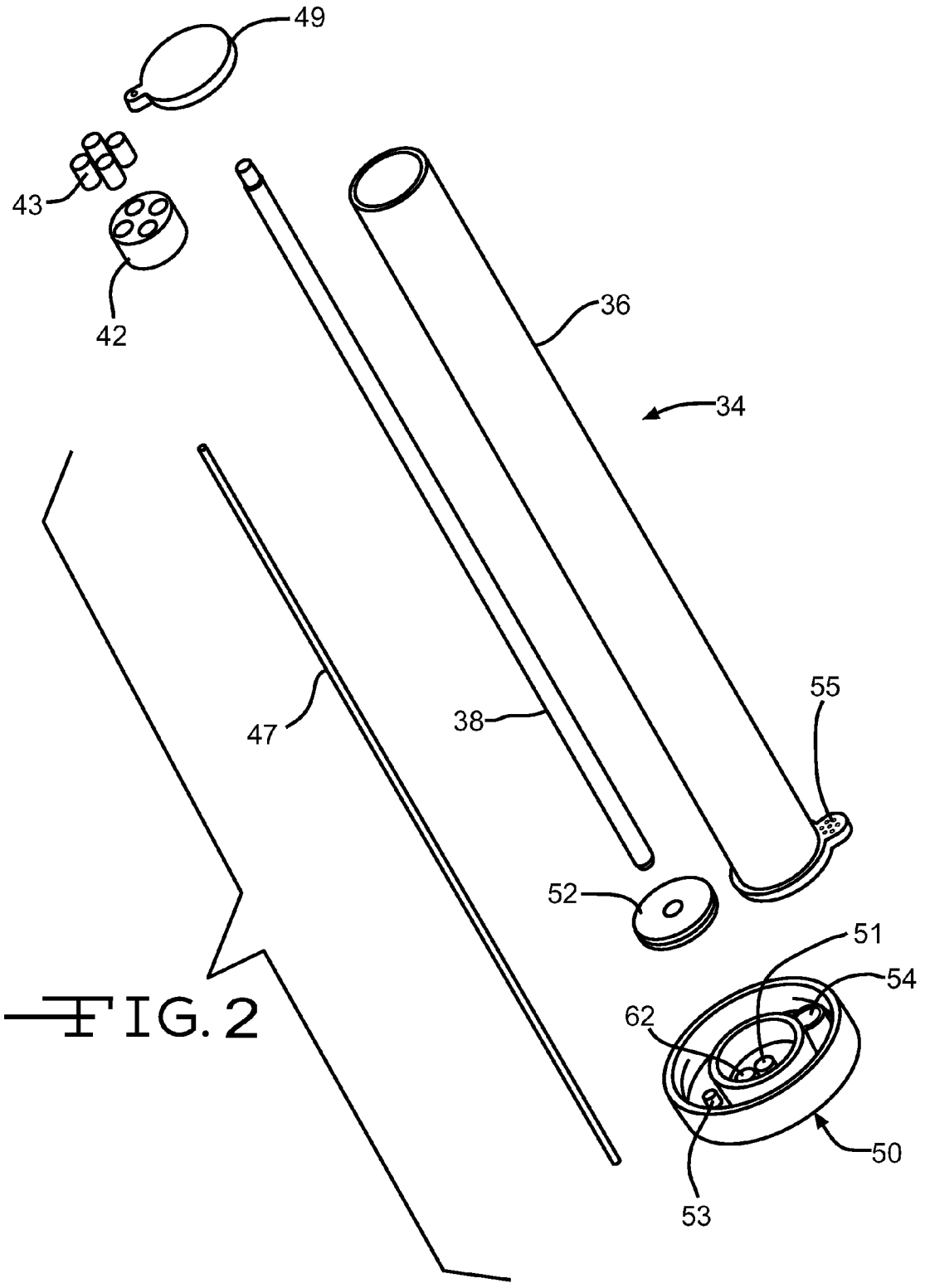


FIG. 2

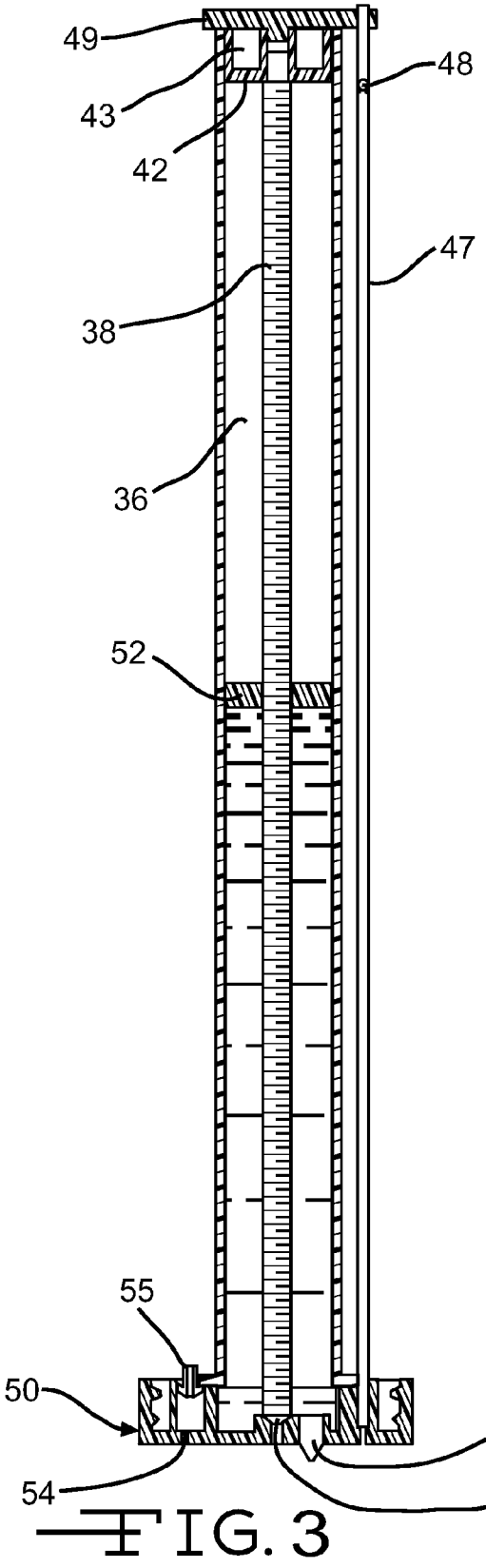


FIG. 3

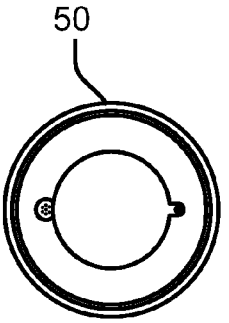


FIG. 4

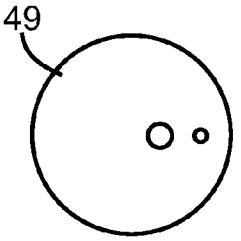
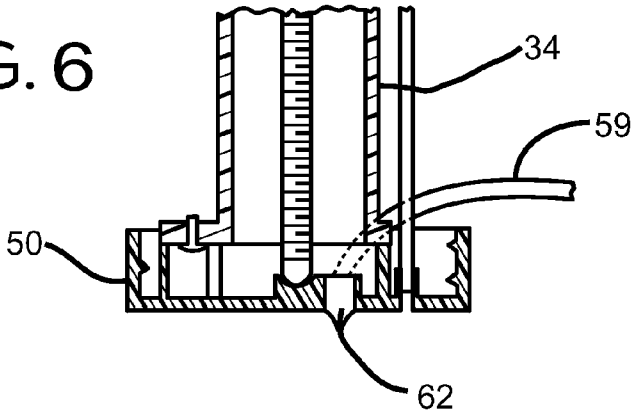


FIG. 5

FIG. 6



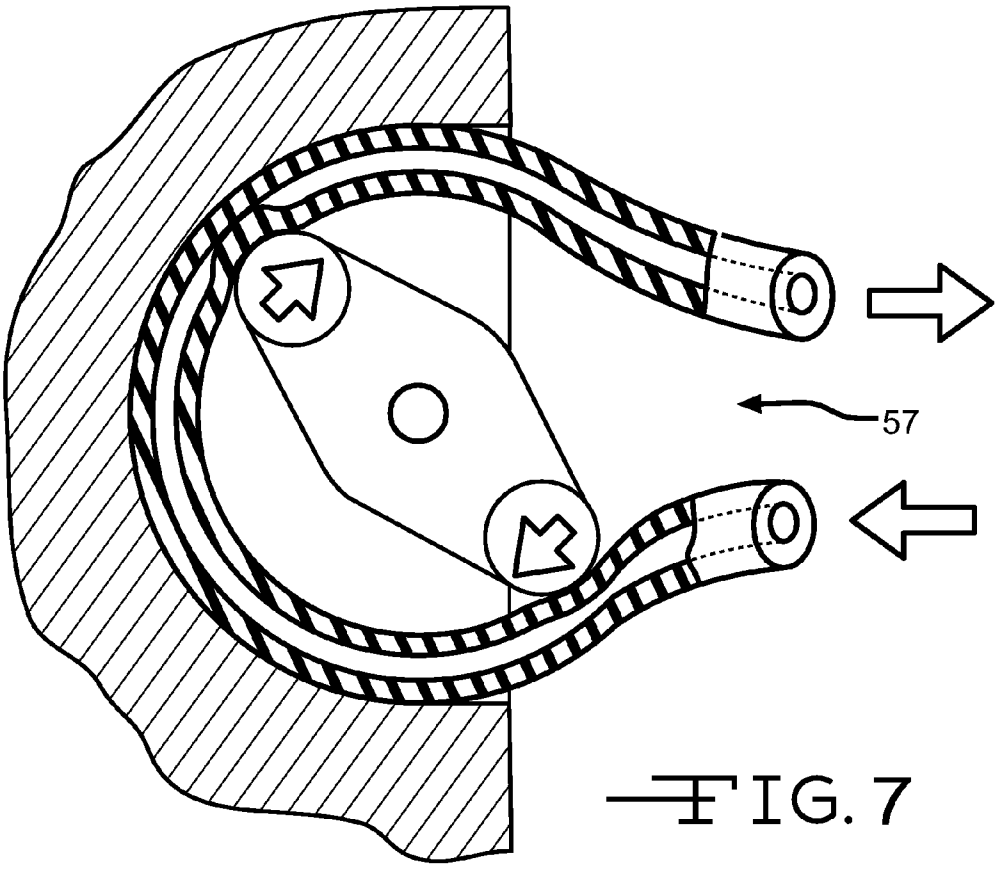


FIG. 7

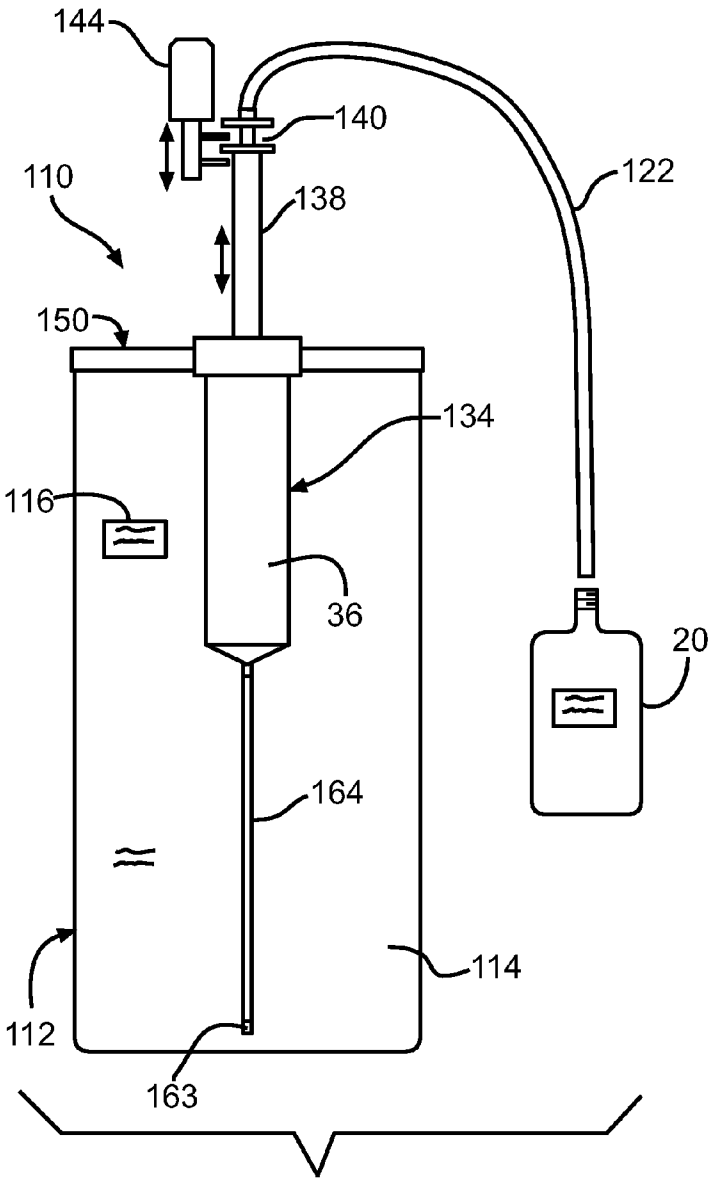

144
140
110
138
122
150
134
116
36
20
164
114
112
163

FIG. 8

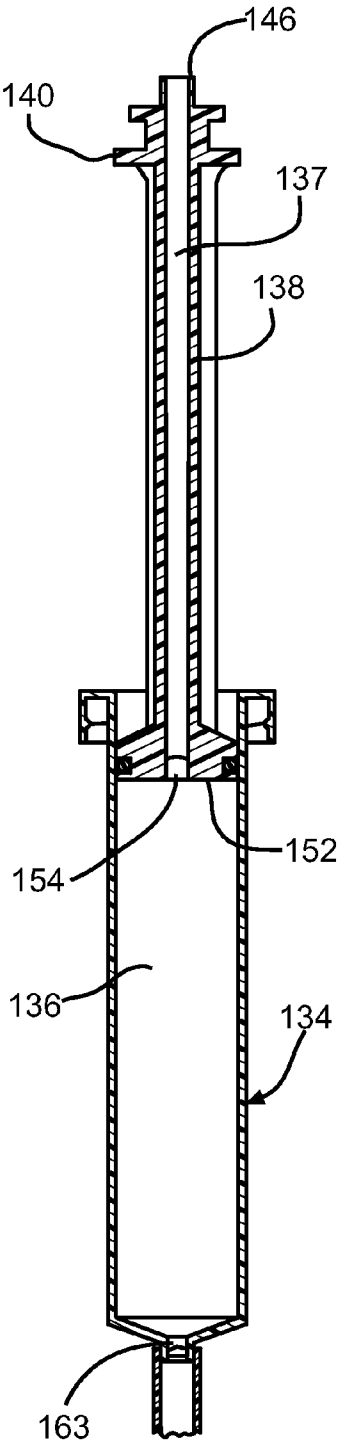

146
140
137
138
154
152
136
134
163

FIG. 9

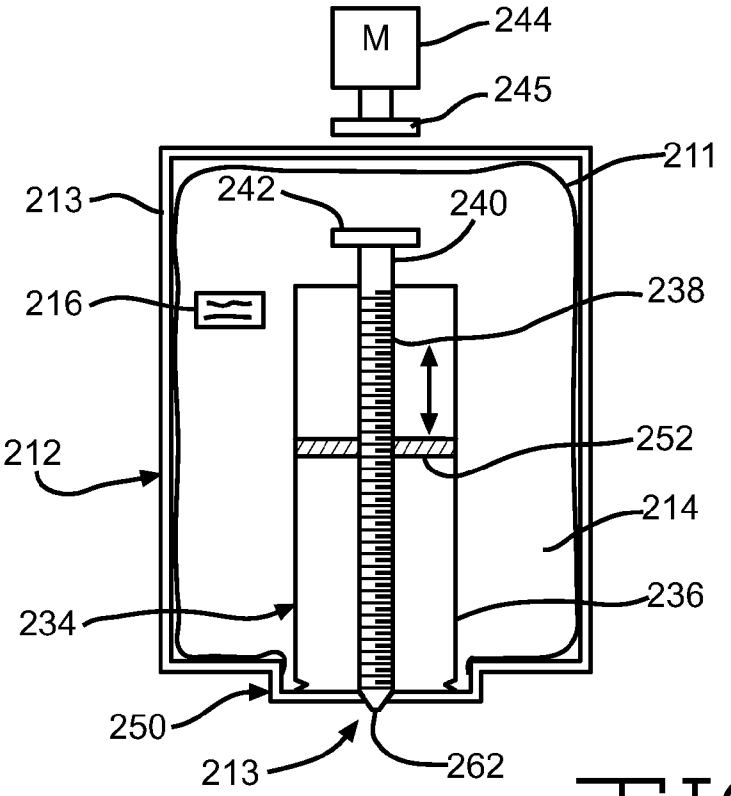

M
244
245
211
213
242
240
216
238
212
252
214
234
236
250
213
262

FIG. 10

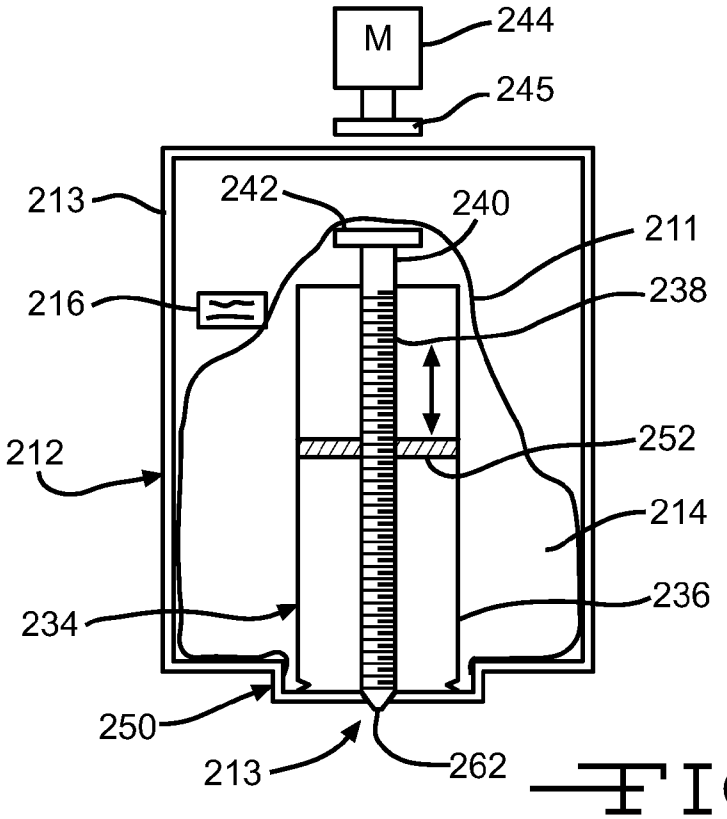

M
244
245
213
242
240
211
216
238
212
252
214
234
236
250
213
262

FIG. 11

SYSTEM AND APPARATUS FOR DISPENSING CONCENTRATED MATERIALS

TECHNICAL FIELD

[0001] This invention relates to a mechanism and method for dispensing concentrates into receiving containers.

BACKGROUND OF THE INVENTION

[0002] Cleaning and disinfectant solutions and other chemical compositions can be dispensed from receiving containers, such as spray bottles. Typically, a flow of diluent, such as water, is supplied with a small amount of concentrate, such as soap or other chemical concentrate, through a venturi to make a desired mixture or solution. The mixture is then delivered to a receiving container, such as a hand held spray bottle.

SUMMARY OF THE INVENTION

[0003] According to this invention there is provided a dispensing source container suitable for containing and dispensing fluid concentrate, the source container having an opening suitable for receiving a closure. The source container includes a fluid-tight vessel configured to hold fluid concentrate, and a pump connectable to the opening of the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of fluid concentrate in the temporary reservoir. The pump is also operable to dispense a metered amount of the fluid concentrate from the temporary reservoir to dispense the fluid concentrate from the source container into receiving containers.

[0004] According to this invention there is also provided a dispensing apparatus for dispensing fluid concentrate from a plurality of source containers into a receiving container, the source containers having a uniform opening suitable for receiving a closure. The apparatus includes a connection that enables the apparatus to connect to the opening of any one of the source containers. The apparatus includes a pump configured to be positioned into any one of the source containers and configured to withdraw a portion of the fluid concentrate from the source container and to store the portion of fluid concentrate in a temporary reservoir. The apparatus is also configured to dispense a metered amount of the fluid concentrate from the temporary reservoir to dispense the fluid concentrate into receiving containers.

[0005] According to this invention there is also provided a dispensing source container suitable for containing and dispensing fluid concentrate, where the source container includes a fluid-tight vessel configured to hold fluid concentrate, and a pump mounted within the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of fluid concentrate in the temporary reservoir. The pump is also operable to dispense a metered amount of the fluid concentrate from the temporary reservoir to dispense the fluid concentrate from the source container into receiving containers. One or more outlet valves control the flow of fluid concentrate from the temporary reservoir to the receiving containers. A flushing system is configured to flush the outlet valves.

[0006] According to this invention there is also provided a dispensing source container suitable for containing and dispensing fluid concentrate. The source container includes a fluid-tight vessel configured to hold fluid concentrate, with a source container outlet opening suitable for discharging fluid concentrate from the source container, wherein the source container outlet opening is connected to a conduit containing a flow of diluent. A pump is connected to the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of the fluid concentrate in the temporary reservoir, wherein the pump is also operable to dispense a metered amount of the fluid concentrate from the temporary reservoir through the outlet opening and into the conduit.

[0007] According to this invention there is also provided a dispensing source container suitable for containing and dispensing fluid concentrate. The source container includes a fluid-tight vessel configured to hold fluid concentrate, with a source container outlet opening suitable for discharging fluid concentrate from the source container. A pump is connected to the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of the fluid concentrate in the temporary reservoir. A controller is connected to the pump and operable to control the pump, wherein the controller is configured to monitor the withdrawal of fluid concentrate from the vessel and to prevent the pump from attempting to withdraw fluid concentrate from the vessel after the vessel has been emptied.

[0008] According to this invention there is also provided apparatus for dispensing fluid concentrate from a source container into a receiving container. The apparatus includes a piston pump including a temporary reservoir, a piston shaft, and a piston shaft, with the piston having a hollow center passageway to allow the fluid concentrate to flow upwardly through the piston when the piston is moved downwardly. The piston has a one-way discharge valve configured to limit the flow of the has a one-way inlet valve at its lower end to allow upward flow of concentrate into the piston pump, but prevent downward flow of concentrate out of the piston pump.

[0009] According to this invention there is also provided apparatus for dispensing fluid concentrate from a source container into a receiving container. The apparatus includes a piston pump including a temporary reservoir and a piston. The piston pump has a one-way inlet valve to allow the fluid concentrate to flow into the piston temporary reservoir when the piston is moved upwardly. The piston pump has a one-way outlet valve at its lower end to allow downward flow of concentrate from the piston pump when the piston is moved downwardly. The piston pump is readily removable and replaceable with respect to the source container.

[0010] According to this invention there is also provided a container filling apparatus having at least one source container containing a fluid concentrate. A dispensing mechanism is structured to dispense fluid concentrate from the source container into a receiving container. A reading mechanism is capable of reading data from a data indicator on the receiving container, wherein the data indicator identifies data about the receiving container. A controller is configured to receive data from the dispensing mechanism pertaining to the dispensing of fluid concentrate into the receiving container. A transmitter is connected to the controller and configured to send a signal to the receiving container to modify the data on the data indicator of the receiving container in response to the dispensing of fluid concentrate into the receiving container.

[0011] According to this invention there is also provided a container filling apparatus having at least one source con-

tainer containing a fluid concentrate, the source container having a data indicator identifying data about the source container. A dispensing mechanism is structured to dispense fluid concentrate from the source container into a receiving container. A reading mechanism is capable of reading data from a data indicator on the receiving container, wherein the data indicator identifies data about the receiving container. A controller is configured to receive data from the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container. A transmitter is connected to the controller and configured to send a signal to the source container to modify the data on the data indicator of the source container.

[0012] According to this invention there is also provided a container filling apparatus having at least one source container containing a fluid concentrate, the source container having a data indicator identifying data about the source container. A dispensing mechanism is structured to dispense fluid concentrate from the source container into a receiving container. A reading mechanism is capable of reading data from a data indicator on the source container. A controller is configured to receive data from the source container and the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container. A transmitter is connected to the controller and configured to send a signal to the source container to modify the data on the data indicator of the source container.

[0013] According to this invention there is also provided a container filling apparatus including at least one source container containing a fluid concentrate, the source container having a data indicator identifying data about the source container. A dispensing mechanism is structured to dispense fluid concentrate from the source container into a receiving container. A reading mechanism is capable of reading data from a data source container. A controller is configured to receive data from the source container and the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container. The controller is configured to receive data from an additional source container of fluid concentrate, the additional source container having a data indicator identifying data about the additional source container, and to control the dispensing mechanism in response to data on the data indicator of the additional source container.

[0014] According to this invention there is also provided a container filling apparatus including at least one source container containing a fluid concentrate, the source container having a data indicator identifying data about the source container. A dispensing mechanism is structured to dispense fluid concentrate from the source container into a receiving container. A reading mechanism is capable of reading data from a data indicator on the source container. A controller is configured to receive data from the source container and the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container, wherein the controller is configured to supply the data to an inventory supply and management system.

[0015] According to this invention there is also provided a container filling apparatus having at least one source container containing a fluid concentrate, the source container having a data indicator identifying data about the source container. A dispensing mechanism is structured to dispense fluid concentrate from the source container into a receiving container. A reading mechanism is capable of reading data from a data indicator on the source container. A controller is configured to receive data from the source container and the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container. A transmitter is connected to the controller and configured to send a signal to the source container to modify the data on the data indicator of the source container. The controller is configured to send a signal to the source container data indicator foreclosing additional dispensing from the source container when the source container reaches a predetermined condition.

[0016] According to this invention there is also provided a container filling apparatus including a dispensing mechanism structured to dispense fluid concentrate from source containers into a receiving containers, wherein the source containers have data indicators identifying data about the source container, including data pertaining to the origin of the source container. A reading mechanism is capable of reading data from the data indicators on the source containers. A controller is configured to receive data from the source container and to control the dispensing of the fluid concentrate into receiving containers, the controller being configured to initialize itself upon receiving origin data from a first source container wherein the controller becomes configured to accept source containers only from the origin of the first source container, and to prevent dispensing of the fluid concentrate from source containers from a different origin.

[0017] Various advantages of this invention will become apparent to those skilled in the art from the following detailed description of the preferred embodiment, when read in light of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. **1** is a schematic view in elevation of a concentrate dispensing system.

[0019] FIG. **2** is an exploded schematic view of the piston pump of FIG. **1**.

[0020] FIG. **3** is a cross-sectional view of the piston pump of FIG. **1**.

[0021] FIG. **4** is plan view of the cap of the piston pump.

[0022] FIG. **5** is a plan view of the top plate of the piston pump.

[0023] FIG. **6** is a cross-sectional view of an embodiment of a discharge valve of a piston pump including a flushing system.

[0024] FIG. **7** is a cross-sectional view in elevation of another embodiment, including peristaltic pump.

[0025] FIG. **8** is a schematic view in elevation of another embodiment of a concentrate dispensing system, wherein the fluid concentrate is discharged upwardly is by a piston pump.

[0026] FIG. **9** is a cross-sectional view of the piston pump of FIG. **8**.

[0027] FIG. **10** is a cross-sectional view in elevation of yet another embodiment, having a bag for containing the concentrate.

[0028] FIG. **11** is a view of the embodiment of FIG. **10**, with the bag partially collapsed.

DETAILED DESCRIPTION OF THE INVENTION

[0029] As shown in FIG. **1**, the system for dispensing concentrated materials, indicated generally at **10**, includes a source container **12** having a fluid-tight vessel **11** for holding the fluid concentrate **14**. The source container **12** optionally

includes machine-readable indicia, such as an RFID label **16**, to indicate to a controller **15**, via a reader, not shown, the content or composition of the concentrate **14**. In other embodiments, there is no machine-readable indicia. The source container can be of many different configurations, but includes the fluid-tight vessel **11** configured to hold the fluid concentrate. Any number of concentrated fluids can be dispensed, such as, for example, concentrated soap, concentrated disinfectants, and concentrated food. A receiving container **20** is positionable beneath the source container **12** to receive the concentrate **14**. In one embodiment, the receiving container is filed with diluent **24**, such as water, before a small amount of the concentrate **14** is added. The receiving container **20** optionally includes machine-readable indicia, such as an RFID label **26**, to indicate to the controller **15**, via a scanner, not shown, the size and nature of the receiving container **20**. An appropriate receiving container top, not shown, with a spray handle, is typically associated with the receiving container **20**. Other types of receiving containers, such as mop buckets, can be used.

[0030] The source container includes a discharge opening generally indicated at **13**. This opening **13** optionally can be configured with a threads to receive a removable, threaded cap **18** during shipping and storage of the source container **12**.

[0031] Positioned within the source container **12** is piston pump **34**. The piston pump **34** is configured to withdraw the concentrate **14** from the source container vessel **11** and then dispense the concentrate in a controlled manner through an exit valve **62** in the discharge opening **13**, and into the receiving container **20**. The piston pump **34** includes a chamber or temporary reservoir **36** for receiving and dispensing concentrate, a plunger or piston shaft **38**, and a piston head **52**. The temporary reservoir **36** serves to hold fluid concentrate **14** as needed during the process of dispensing the fluid concentrate. The piston shaft **38** can be any suitable length. The piston shaft **38** can be operated by any suitable means, as will be explained below. In one embodiment the piston pump **34** is a syringe pump.

[0032] The piston head **52** is connected to the piston shaft **38** and is mounted for axial movement through the temporary reservoir **36**. The movement of the piston head **52** through the temporary reservoir **36** can be accomplished in any suitable manner. In the embodiment shown in FIG. **1**, the piston head **52** is mounted with a threaded connection to the piston shaft **38**, which is a rotatable threaded shaft. Rotation of the shaft **38** causes the piston head **52** to move vertically up or down within the temporary reservoir. Downward movement of the piston head **52** causes the concentrate **14** within the temporary reservoir **36** of the piston pump **34** to be moved downwardly, through the one-way exit valve **62** and into the receiving container **20**. Movement upward causes the temporary reservoir **36** to be filled by withdrawing concentrate **14** from the surrounding vessel **11** of the source container **12**.

[0033] As shown in FIGS. **1-3**, the shaft **38** includes at its top end **40** a bearing journal **41** to mount the shaft **38** for rotation. Also at the top of the shaft is a rotatably mounted hub **42** which is configured to hold magnets **43**. Other schemes for holding the magnets **43** can be used. Positioned in close proximity to the hub **42** containing the magnets **43** is a stepper motor **44** connected to a rotatable motor magnet **45**. The stepper motor **44** is configured to rotate the rotatable motor magnet **45** in discrete, is measured rotational increments in response to signals from the controller **15**. The stepper motor **44** and rotatable magnet **45** are shown as being outside the source container **12**. It is to be understood that in other embodiments the rotatable magnet **45** can be positioned within the source container **12**. The rotatable magnet **45** is aligned with the hub **42** and magnets **43** so that rotation of the rotatable magnet **45** will cause a corresponding rotation of the hub **42**, and therefore a rotation of the threaded shaft **38**. Rotation of the shaft **38** in turn causes movement of the piston head **52** axially within the temporary reservoir. It is to be understood that other means besides a stepper motor **44** can be used for rotating the rotatable magnet **45**. Also, other mechanisms beside rotating magnets, such as for example, a vacuum system, can be used to move the piston head **52** up and down within the temporary reservoir **36**.

[0034] As shown in FIGS. **1-5**, the piston pump **34** includes an optional vent tube **47** for venting the vessel **11** of the source container **12** as the fluid **14** is removed during dispensing operations. A check ball **48** can optionally be positioned in the vent tube **47**. Other means of venting the vessel **11** can be used.

[0035] A cap **49** can be placed on the top of the temporary reservoir **36** for seating the hub **42**, the shaft **38**, and the vent tube **47**, and for sealing the temporary reservoir **36**.

[0036] Positioned at the bottom of the piston pump **34** is a piston mounting cap **50**. The piston cap **50** is provided with threads to enable the cap **50** and piston pump **34** to be threaded onto the opening **13** of the source container **12** in a fluid-tight connection after removal of the shipping cap **18**. The cap **50** includes a mounting for the piston pump **34** and for the exit valve **62**, and also provides a seat or bearing **51** for the shaft **38**. The cap further includes a seat **53** for the vent tube **47**.

[0037] The one-way exit valve **62** can be any valve suitable for controlling the flow of fluid concentrate from the temporary reservoir to the receiving containers. In the illustrated embodiment, a one-way duckbill valve is used. Other valves can be is used. The valve need not be a one-way valve, but a one-way valve gives the advantage avoiding the inspiration of air during the filling of the temporary reservoir **36** when the piston head **52** is drawn up. Although a single valve **62** is shown, one or more valves controlling the flow of fluid concentrate **14** from the temporary reservoir **38** to the receiving containers **20** can be used.

[0038] An intake chamber or well **54** is mounted in the cap **50** to provide access or fluid communication from the vessel **11** to the temporary reservoir **36**. The flow of fluid concentrate **14** between the vessel **11** and the temporary reservoir **36** is controlled by one or more inlet valves **55**. The inlet valve **55** can be an umbrella valve, as shown in FIG. **4**, or any other suitable valve. It is advantageously a one-way valve to prevent reintroduction of the fluid concentrate into the source container vessel **11** during downward pumping of the piston **34**.

[0039] In typical operation, the stepper motor **44** is first operated to drive the piston head **52** to the bottom of the temporary reservoir **36** of the piston pump **34**. Then the piston head **52** is moved upward, drawing fluid concentrate **14** through the inlet valve **55** into the temporary reservoir **36**. In one embodiment of operation, the receiving container is filled with diluent, such as water, before the addition of a small amount of the fluid concentrate. When a discharge of concentrate is desired, the stepper motor **44** moves the piston head **52** incrementally downward, forcing the desired amount of concentrate to flow downward through the one-way exit valve **62** and into the receiving container **20**. Once all of the concen-

trate **14** in the temporary reservoir **36** is discharged into a multiplicity of receiving containers **20**, the stepper motor **44** is operated to raise the piston head **52** again, thereby refiling the temporary reservoir **36** of the piston pump **34** with additional concentrate from the vessel **11**.

[0040] It is to be understood that after the source container **12** is filled by the supplier of the concentrate material, the source container can be shipped with the pump **34** positioned within the source container, or in the alternative can be shipped with the pump accompanying the source container.

[0041] If the pump is shipped outside of the source container, the customer using the dispensing apparatus removes the shipping cap **18** and installs the pump **34** before using the apparatus. Further, the pump can be part of a dispensing apparatus for dispensing fluid concentrate from a plurality of source containers into a receiving container, where the source containers have a uniform opening suitable for receiving a closure, such as the shipping bottle cap **18**. The apparatus includes a connection (e.g. threaded connection) that enables the apparatus to connect to the opening of any one of the plurality of source containers. The apparatus includes a pump configured to be positioned into any one of the source containers and configured to withdraw a portion of the fluid concentrate from the source container and to store the portion of fluid concentrate in a temporary reservoir. The apparatus also can be configured to dispense a metered amount of the fluid concentrate from the temporary reservoir to dispense the fluid concentrate into receiving containers.

[0042] Although in the embodiment illustrated in FIGS. **1-5** shows the temporary reservoir **36** being positioned within the piston pump **34**, the temporary reservoir can be external of the piston pump. Further, although the piston pump **34** is illustrated as being within the source container **12**, the piston pump can be external of the source container **12**, such as, for example with a conduit, not shown, connecting the fluid concentrate in the source container with the temporary reservoir of the pump. In the embodiment illustrated in FIGS. **1-5** the diluent is described as being water. It is to be understood that the diluent can be other substances, such as solvents, alcohol, sterile solutions, and other hygienic solutions. Further, although the fluid concentrate has been illustrated and described as being a liquid, it is to be understood that the term "fluid concentrate" includes gels and finely divided solids, such as powders and granular materials. In one embodiment, the fluid concentrate is a concentrated pharmacological substance. The concentrated pharmacological substance is metered out or dispensed in a precise, measured way with the pump of the dispensing source container.

[0043] In one embodiment, the system **10** for dispensing concentrate includes a flushing system for minimizing contamination of the apparatus. As shown in FIG. **6**, a hose or other conduit **59** is connected to a source of flushing fluid, such as water. A valve, not shown, is controlled by the controller **15**, to manage the flow of flushing fluid through the outlet valve **62**. The flushing system can be configured in any manner to allow the apparatus to be flushed.

[0044] The flushing system can be modified to be used as a venturi system for filling receiving containers. The venturi system would include a pump connected to the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of the fluid concentrate in the temporary reservoir. The pump is operable to dispense a metered amount of the fluid concentrate from the temporary reservoir through the outlet opening and into the conduit **59**. The proper amount of fluid concentrate is dispensed into the conduit **59** to result in the desired concentration of liquid in the receiving container.

[0045] Although in the embodiment shown in FIGS. **1-5** the piston pump **34** is a syringe pump, other types of pumps can be used. For example, a peristaltic pump **57**, shown in FIG. **7**, can be used. Examples of other pumps that can be used include a rolling bellows pump and a collapsable bag pump.

[0046] FIGS. **8** and **9** illustrate a system **110** wherein a source container **112** has its opening at the top, and a piston pump **134** is positioned inside the source container to dispense fluid concentrate **114** into a receiving container **20**. The piston **134** has a piston shaft **138** that includes a top end **140** with a connection configured to connect to a stepper motor **144**. The stepper motor is arranged to drive the piston **138** and its piston head **152** up or down in the piston temporary reservoir **136**. The piston also includes a hollow center passageway **137** to the allow the fluid concentrate to flow upwardly through the piston when the piston shaft **138** is moved downwardly. The passageway **137** terminates in a fitting **146** for connection with a distribution tube **122**. A cap **150** at the top end **140** of the piston pump **134** is threaded for connection with the cap **150** of the source container **112**. Any suitable connection can be used.

[0047] The piston head **152** is provided with a one-way discharge valve **154** that allows fluid flow only in the upward direction, into the passageway **44**. A seal, not shown, seals the piston head **152** against the walls of the temporary reservoir **136**. The lower end of the piston pump **134** includes a suction valve or inlet valve **163**, which can be a duck bill valve or any other suitable one-way valve. The inlet valve **163** can be connected to the dip tube **164** which is sized to connect the piston pump **34** to the bottom area of the temporary reservoir **136**.

[0048] In typical operation, the stepper motor **144** is first operated to drive the piston shaft **138** to the bottom of the temporary reservoir **136** of the piston pump **134**. Then the piston moved upward, drawing fluid concentrate **114** through the inlet valve **163** into the temporary reservoir **136**. When a discharge of concentrate is desired, the stepper motor **144** moves the piston shaft **138** incrementally downward, forcing the desired amount of concentrate to flow upward through the discharge valve **154**, through the hollow center passageway **137**, and along the distribution tube **122** to the receiving container **120**.

[0049] It is to be understood that in any of the embodiments, the stepper motor **44** or **144** can be controlled by the controller **15**, and the controller can be configured to keep track of the amount of concentrate dispensed, and to prevent unauthorized discharging from, tampering with, or filling of the source container **12** or **112**.

[0050] While in the embodiment illustrated in FIGS. **7-8** the source container **112** is shown as being upright, and in the embodiment shown in FIGS. **1-5** the source container **12** is shown as being inverted, it is to be understood that the source container and piston pumps can be oriented in any suitable orientation.

[0051] In the embodiment shown in FIGS. **10** and **11**, the source container **212** and piston pump **236** are largely similar to the corresponding elements of the embodiment shown in FIGS. **1-5**. However the source container **212** is comprised of a bottle, container, or other mounting structure **213** configured to support a bag **211** containing a quantity of fluid

concentrate, and the bag **211** becomes the fluid tight vessel. The piston pump **234** includes a piston shaft **238** on which is mounted the head **252**. The bottom cap **250** includes a one-way exit valve **262** for discharging the fluid concentrate into the receiving container. As the concentrated material **214** is consumed or dispensed by the downward movement of the piston head **252**, the bag **211** will collapse, as shown in FIG. **11**. This embodiment has the advantage of reducing the amount container material remaining after all the concentrate as been dispensed from the source container.

[0052] In one embodiment, as shown in FIG. **1**, a reading mechanism **15**A is capable of reading data from a data indicator **16** on the source container. The reading mechanism **15**A is connected to the controller **15** *y* any suitable means. Further, a reading mechanism **15**B can be associated with the data indicator **26** on the receiving container **20**, and this reading mechanism is also connected to the controller **15**. Optionally, the reading mechanisms **15**A and **15**B can be equipped with transmitters suitable for sending signals to the respective data indicators **16** and **26** to modify the data in those respective data indicators.

[0053] The principle and mode of operation of this invention have been described in its preferred embodiments. However, it should be noted that this invention may be practiced otherwise than as specifically illustrated and described without departing from its scope.

1. A dispensing source container suitable for containing and dispensing fluid concentrate, the source container having an opening suitable for receiving a closure, the source container comprising:

a fluid-tight vessel configured to hold fluid concentrate;

a pump connectable to the opening of the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of fluid concentrate in the temporary reservoir;

wherein the pump is also operable to dispense a metered amount of the fluid concentrate from the temporary reservoir to dispense the fluid concentrate from the source container into receiving containers.

2. The dispensing source container of claim **1** wherein the pump is a piston pump.

3. The dispensing source container of claim **2** wherein the pump is a piston pump.

4. The dispensing source container of claim **1** wherein the pump is a peristaltic pump.

5. The dispensing source container of claim **1** including one or more inlet valves controlling the flow of fluid concentrate between the vessel and the reservoir, and one or more outlet valves controlling the flow of fluid concentrate from the temporary reservoir to the receiving containers.

6. The dispensing source container of claim **1** in which the pump is connectable to the opening of the source container

7. The dispensing source container of claim **1** in which the pump is a piston pump mounted within the source container, the piston pump having the temporary reservoir and a piston head mounted for movement within the temporary reservoir, the dispensing source container further including one or more inlet valves connected between the fluid-tight vessel and the temporary reservoir, and one or more outlet valves connected between the temporary reservoir and the source container outlet; and dispensing source container further including a mechanism operable to move the piston head within the temporary reservoir, wherein movement of the piston head in one direction draws fluid concentrate from the vessel into the temporary reservoir, and movement of the piston head in another direction dispenses fluid concentrate from the temporary reservoir and out of the source container via the source container outlet.

8. The dispensing source container of claim **7** in which the piston pump is a syringe pump that includes a threaded piston shaft connected to the piston head, and in which the mechanism for moving the piston head is a worm gear for moving the piston shaft within the temporary reservoir.

9. The dispensing source container of claim **8** in which the mechanism for moving the piston head includes:

a syringe magnet mounted at an end of the piston shaft, and

a rotatably mounted magnet external of the vessel, with the external rotatable magnet being positioned sufficiently close to the syringe magnet to effect rotation of the syringe magnet by rotation of the external rotatable magnet, wherein rotation of the syringe magnet rotates the piston shaft thereby enabling moving of the piston head within the temporary reservoir.

10. The dispensing source container of claim **9** including an air vent in the vessel.

11. A dispensing apparatus for dispensing fluid concentrate from a plurality of source containers into a receiving container, the source containers having a uniform opening suitable for receiving a closure, the apparatus including a connection that enables the apparatus to connect to the opening of any one of the source containers, the apparatus including a pump configured to be positioned into any one of the source containers and configured to withdraw a portion of the fluid concentrate from the source container and to store the portion of fluid concentrate in a temporary reservoir, the apparatus also configured to dispense a metered amount of the fluid concentrate from the temporary reservoir to dispense the fluid concentrate into receiving containers.

12. The dispensing apparatus of claim **11** in which the pump is a piston pump.

13. The dispensing apparatus of claim **11** including one or more inlet valves controlling the flow of fluid concentrate between the source container and the reservoir, and one or more outlet valves controlling the flow of fluid concentrate from the temporary reservoir to the receiving containers.

14. A dispensing source container suitable for containing and dispensing fluid concentrate, the source container comprising:

a fluid-tight vessel configured to hold fluid concentrate;

a pump mounted within the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of fluid concentrate in the temporary reservoir, wherein the pump is also operable to dispense a metered amount of the fluid concentrate from the temporary reservoir to dispense the fluid concentrate from the source container into receiving containers;

one or more outlet valves controlling the flow of fluid concentrate from the temporary reservoir to the receiving containers; and

a flushing system configured to flush the outlet valves.

15. The dispensing source container of claim **14** wherein the flushing system includes a conduit connected to a source of flushing fluid.

16. A dispensing source container suitable for containing and dispensing fluid concentrate, the source container comprising:

a fluid-tight vessel configured to hold fluid concentrate;

a source container outlet opening suitable for discharging fluid concentrate from the source container, wherein the source container outlet opening is connected to a conduit containing a flow of diluent; and

a pump connected to the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of the fluid concentrate in the temporary reservoir, wherein the pump is also operable to dispense a metered amount of the fluid concentrate from the temporary reservoir through the outlet opening and into the conduit.

17. A dispensing source container suitable for containing and dispensing fluid concentrate, the source container comprising:

a fluid-tight vessel configured to hold fluid concentrate;

a source container outlet opening suitable for discharging fluid concentrate from the source container;

a pump connected to the source container, the pump having a temporary reservoir, the pump being operable to withdraw a portion of the fluid concentrate from the source container and to store the portion of the fluid concentrate in the temporary reservoir; and

a controller connected to the pump and operable to control the pump, wherein the controller is configured to monitor the withdrawal of fluid concentrate from the vessel and to prevent the pump from attempting to withdraw fluid concentrate from the vessel after the vessel has been emptied.

18. Apparatus for dispensing fluid concentrate from a source container into a receiving container, the apparatus comprising:

a piston pump including a temporary reservoir, a piston shaft, and a piston shaft, with the piston having a hollow center passageway to allow the fluid concentrate to flow upwardly through the piston when the piston is moved downwardly;

the piston having a one-way discharge valve configured to limit the flow of the concentrate through the passageway to an upward direction only; and

the piston pump having a one-way inlet valve at its lower end to allow upward flow of concentrate into the piston pump, but prevent downward flow of concentrate out of the piston pump.

19. The apparatus of claim **18** in which the piston pump is configured to be readily removable and replaceable with respect to source containers of the concentrate.

20. Apparatus for dispensing fluid concentrate from a source container into a receiving container, the apparatus comprising a piston pump including a temporary reservoir and a piston:

the piston pump having a one-way inlet valve to allow the fluid concentrate to flow into the piston temporary reservoir when the piston is moved upwardly; and

the piston pump having a one-way outlet valve at its lower end to allow downward flow of concentrate from the piston pump when the piston is moved downwardly;

wherein the piston pump is readily removable and replaceable with respect to the source container.

21. A container filling apparatus comprising:

at least one source container containing a fluid concentrate;

a dispensing mechanism structured to dispense fluid concentrate from the source container into a receiving container;

a reading mechanism capable of reading data from a data indicator on the receiving container, wherein the data indicator identifies data about the receiving container;

a controller configured to receive data from the dispensing mechanism pertaining to the dispensing of fluid concentrate into the receiving container; and

a transmitter connected to the controller and configured to send a signal to the receiving container to modify the data on the data indicator of the receiving container in response to the dispensing of fluid concentrate into the receiving container.

22. The apparatus of claim **20** in which the controller is configured to modify the data on the data indicator of the receiving container to indicate the number of times the receiving container has been given fluid concentrate.

23. A container filling apparatus comprising:

at least one source container containing a fluid concentrate, the source container having a data indicator identifying data about the source container;

a dispensing mechanism structured to dispense fluid concentrate from the source container into a receiving container;

a reading mechanism capable of reading data from a data indicator on the receiving container, wherein the data indicator identifies data about the receiving container;

a controller configured to receive data from the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container; and

a transmitter connected to the controller and configured to send a signal to the source container to modify the data on the data indicator of the source container.

24. The apparatus of claim **23** in which the controller is configured to modify the data on the data indicator of the source container in response to the data on the receiving container.

25. The apparatus of claim **24** in which the controller is configured to modify the data on the data indicator of the source container by changing dosage data on the source container in response to the data on the receiving container.

26. A container filling apparatus comprising:

at least one source container containing a fluid concentrate, the source container having a data indicator identifying data about the source container;

a dispensing mechanism structured to dispense fluid concentrate from the source container into a receiving container;

a reading mechanism capable of reading data from a data indicator on the source container;

a controller configured to receive data from the source container and the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container; and

a transmitter connected to the controller and configured to send a signal to the source container to modify the data on the data indicator of the source container.

27. The apparatus of claim **26** in which the controller is configured to modify the data on the data indicator of the

source container to indicate the amount of fluid concentrate remaining in the source container.

28. The apparatus of claim **26** in which the controller is configured to modify the data on the data indicator of the source container to indicate a dilution rate for the source container.

29. A container filling apparatus comprising:

at least one source container containing a fluid concentrate, the source container having a data indicator identifying data about the source container;

a dispensing mechanism structured to dispense fluid concentrate from the source container into a receiving container;

a reading mechanism capable of reading data from a data indicator in the source container; and

a controller configured to receive data from the source container and the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container;

wherein the controller is configured to receive data from an additional source container of fluid concentrate, the additional source container having a data indicator identifying data about the additional source container, and to control the dispensing mechanism in response to data on the data indicator of the additional source container.

30. A container filling apparatus comprising:

at least one source container containing a fluid concentrate, the source container having a data indicator identifying data about the source container;

a dispensing mechanism structured to dispense fluid concentrate from the source container into a receiving container;

a reading mechanism capable of reading data from a data indicator on the source container; and

a controller configured to receive data from the source container and the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container, wherein the controller is configured to supply the data to an inventory supply and management system.

31. A container filling apparatus comprising:

at least one source container containing a fluid concentrate, the source container having a data indicator identifying data about the source container;

a dispensing mechanism structured to dispense fluid concentrate from the source container into a receiving container;

a reading mechanism capable of reading data from a data indicator on the source container;

a controller configured to receive data from the source container and the dispensing mechanism pertaining to the dispensing of fluid concentrate from the source container into the receiving container; and

a transmitter connected to the controller and configured to send a signal to the source container to modify the data on the data indicator of the source container;

wherein the controller is configured to send a signal to the source container data indicator foreclosing additional dispensing from the source container when the source container reaches a predetermined condition.

32. The apparatus of claim **31** in which the predetermined condition is the emptying of the source container.

33. The apparatus of claim **31** in which the predetermined condition is the contamination of the source container.

34. The apparatus of claim **31** in which the data indicator of the source container is reprogrammable so that it can be reset to allow additional dispensing from the source container.

35. A container filling apparatus comprising:

a dispensing mechanism structured to dispense fluid concentrate from source containers into a receiving containers, wherein the source containers have data indicators identifying data about the source container, including data pertaining to the origin of the source container;

a reading mechanism capable of reading data from the data indicators on the source containers;

a controller configured to receive data from the source container and to control the dispensing of the fluid concentrate into receiving containers, the controller being configured to initialize itself upon receiving origin data from a first source container wherein the controller becomes configured to accept source containers only from the origin of the first source container, and to prevent dispensing of the fluid concentrate from source containers from a different origin.

36. The apparatus of claim **35** in which the controllable so that it can be reset to allow dispensing from source containers from a different origin.

* * * * *